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Abstract Submitted
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Low energy electron attachment at sub-meV resolution A. KORTYNA, Colby College, P.-T. HOWE, M. DARRACH, A. CHUTJIAN, Jet Propulsion Laboratory, California Institute of Technology — Single-photon ionization of rare-gas atoms is used to produce low energy electrons for the study of electron attachment to SF₆. Vacuum ultraviolet laser radiation ($\lambda \approx 92$ nm), produced by nonlinear up-conversion techniques, is tunable in the vicinity of the $2P_{1/2}^0$ ionization threshold of xenon. A beam of xenon atoms thus yields photoelectrons that then scattering from SF₆ target molecules admixed into the xenon beam. The photoelectron energy, ϵ , is scanned over the range $0 \leq \epsilon \leq 84$ meV. A Monte Carlo model of the attachment signal, when compared to data, clearly shows that the electron energy distribution is well characterized by a Gaussian width $< 100 \mu\text{eV}$ and that the electron attachment cross section obeys the $\epsilon^{-1/2}$ energy dependence expected for s-wave scattering below 5 meV without need for the modification of the Wigner threshold law. At higher energies ($\epsilon = 45 \pm 1$ meV) resonant structure in the attachment cross section reveals the opening of an inelastic attachment channel associated with one quanta of the ω_6 vibrational mode of SF₆ whose excitation energy has been measured previously to be 44.0 ± 0.2 meV. Further investigations into the threshold behavior of the electron attachment cross section are underway.

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- ☐ Prefer Oral Session
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